Staff Review and Recommendations.

Staff has participated in several meetings with representatives from GTE, SWBT, and Bellcore to develop an understanding of both the theoretical basis and the application of the switching cost models proposed for use in cost studies filed pursuant to § 23.91. Staff's review of the switching cost models has entailed verification of the calculations used in the models to determine switch resource capacity costs and switch function investments.

The Model Office Module

To verify the calculations used to develop C.O.-specific capacity costs for switch resources, Staff selected a sample of switch resources such that each switch resource and each switch technology was represented in the sample. Staff then attempted to replicate the model office results for each switch resource in the sample. Staff used vendor prices, equations, and engineering rules provided as part of the Bellcore SCIS documentation and traffic engineering data and vendor discounts provided by SWBT. Staff reviewed the formulas and determined them to be reasonable. Staff's results were within two percent of SWBT's results. It is assumed that the difference is due to rounding. If SWBT develops new model office outputs pursuant to a new release of the cost models, Staff will once again review the calculations as needed.

To verify the calculations used to develop technology-specific weighted average capacity costs for switch resources, Staff attempted to replicate the weighted averages calculated by SWBT. For all but one technology-specific weighted average capacity cost, Staff's results are within two percent of SWBT's results. It is assumed that the difference is due to rounding. The absolute value of the sole technology-specific weighted average capacity cost that did not fall within the two percent range was so small that Staff considers the difference between Staff's calculation and the model's calculation to be insignificant.

The model office module formulas are very complex and rely on specific engineering rules provided by switch vendors It is impossible for Staff to confirm the validity of each of these switch-specific engineering rules, but taken as a whole Staff believes that the module calculates a reasonable approximation of the capacity costs of switch resources. Staff notes that the SCIS model develops capacity costs for switch resources without regard to the competitiveness of the service that uses those switch resources. The weighted average capacity cost for a particular switch resource developed in the model office module of the switching cost models will be held constant for all future investment studies that use the same release of the cost model. This approach ensures consistent capacity costs for switch resources used to provide monopoly services and for switch resources used to provide competitive services. For example, once the capacity cost of Line CCS is determined, all investment studies that require a Line CCS capacity cost will use the same capacity cost regardless of what service uses the Line CCS. Therefore, the Line CCS capacity cost for monopoly services and the Line CCS capacity cost for competitive services will be consistent

Staff does differ with SWBT with regard to the consistent treatment of "getting started costs." Getting started costs as defined in the SCIS model refer to certain switching components that must be purchased when the switch is installed. Getting started costs include the switch processor cabinets, some maintenance and test equipment, and "breakage." The SCIS model allocates these costs to the central processor switch resource. "Breakage" as the term is used in the SCIS model refers to the unused capacity of some switch parts (i.e. line frames, shelves) that must be purchased in standard sizes. Theoretically, the last part on average will only have a 50% utilization; the unused capacity is termed "breakage." In the model office module, SWBT has exercised an option built into the model that allows it to identify breakage as a common cost to switching rather than allocating breakage to the central processor, as the rest of getting started costs are. Staff believes that the treatment of all getting started costs should be consistent and requests that SWBT include breakage in the model office module calculations. SWBT has agreed to Staff's recommendation.

The Feature Investment Module

To verify the calculations used to develop investment for switch functions, Staff attempted to replicate all of the investment module results. Staff reviewed the formulas and determined them to be reasonable. Staff verified that the inputs to the equations representing capacity costs were the same as the capacity costs calculated in the model office module. Staff then replicated the computations for each switch function for each switch technology. Staff discovered a small number of mathematical errors involving SWBT traffic data and brought these to the attention of SWBT. SWBT agrees to correct these errors when it files amended studies. Apart from the above mentioned errors, Staff was able to replicate SWBT's results.

To verify the calculations used to develop a statewide average investment for switch functions, Staff attempted to replicate the weighted averages calculated by SWBT. Staff's results agreed with SWBT's results. It is assumed that the difference is due to rounding.

For the feature investment module, the equations and many of the inputs used to develop switch function investment are provided by the vendors. While not mathematically challenging, they have many technical specifications that require specific knowledge of the particular switch architecture to be fully understood. Making the problem more complex is the fact that no two switch types provide the same function in the same way. For example, for an identical function, one switch technology uses a central processor while another uses a distributed processor. SWBT adds company-defined inputs such as the average number of Call Waiting attempts in the busy hour per line equipped with Call Waiting.

Staff, after a thorough review of the SCIS model, believes that the model is a valid tool for use in developing costs. Furthermore the complexity of the model, the sheer volume of the inputs to the model, and the calculation of switch resource capacity costs without regard to the service using those switch resources, all make it difficult for the model to be manipulated. On a going forward basis, for SWBT switching BNF LRIC

studies, Staff will at a minimum check to see that the correct capacity costs from the model office module are used and that the feature investment module equations are mathematically correct and appear reasonable. While Staff believes that the SCIS cost model used by SWBT may be utilized in a manner consistent with the principles, instructions, and requirements set forth in § 23.91. Staff reserves the right to challenge a specific application of the SCIS cost model in future LRIC studies if Staff believes SWBT is using the cost model in a manner inconsistent with the principles, instructions, and requirements set forth in § 23.91.

2. Determination of Total Installed Cost.

Once purchased, equipment must be engineered to company specifications, furnished and installed. The costs associated with these activities are traditionally developed by the application of equipment investment factors. SWBT proposes to use six factors to determine these costs: sales tax, telco engineering, telco plant labor, sundry and miscellaneous, power investment, and building investment.

(a) Sales Tax

The sales tax factor represents the state sales tax paid on purchases of material. Sales tax is applied to equipment purchased from vendors in a four-step process. First, SWBT develops a 'Ratio of Material to Total EF&I' factor (see Tab 5 of the '95 Annual Cost Factors binder). This factor is used to determine the cost of vendor material excluding the vendor's cost to design, engineer, and install the equipment.

Second, SWBT develops a state sales tax factor (Line Three on Schedule A of the Calculations Tab, in the SWBT Call Waiting Per Line BNF LRIC Study). This is done by dividing state sales tax paid by total taxable dollars. Three SWBT computerized accounting systems provide the state sales tax paid and total taxable dollars used to develop the tax factor (as seen on Tab 2 of the '95 Annual Cost Factors binder).

Third, the equipment investment (as seen on Line 1 on Schedule A of the Calculations Tab, in the SWBT Call Waiting Per Line BNF LRIC Study) is then multiplied by the "Ratio of Material to Total EF&I" factor (as seen on Line 2 on Schedule A of the Calculations Tab, in the SWBT Call Waiting Per Line BNF LRIC Study) to determine the portion of BNF investment that represents materials. This is then multiplied by the sales tax factor. This results in the sales tax on materials. (as seen in the third column of Line Three on Schedule A of the Calculations Tab, in the SWBT Call Waiting Per Line BNF LRIC Study).

Finally, the equipment investment and the sales tax on materials (Lines 1 and 3) are summed, resulting in Total EF&I Investment (as seen in Line 4 on Schedule A of the Calculations Tab, in the SWBT Call Waiting Per Line BNF LRIC Study).

(b) Telco Engineering

The telco engineering factor represents labor costs for SWBT telephone engineers to perform additional designing and engineering of equipment. This factor is developed by dividing Total Engineering Labor by Total Investment Material (as seen in Tab 5 of the '95 Annual Cost Factors binder). This factor is then multiplied by Total EF&I Investment, resulting in Telco Engineering costs (as seen in Line 5 on Schedule A of the Calculations Tab, in the SWBT Call Waiting Per Line BNF LRIC Study).

(c) Telco Plant Labor

The telco plant labor factor represents labor costs for SWBT to install equipment. This factor is developed by dividing Total Plant Labor by Total Investment Material (as seen in Tab 5 of the '95 Annual Cost Factors binder). This factor is then multiplied by Total EF&I Investment, resulting in Telco Plant Labor costs (as seen in the third column of Line 6 on Schedule A of the Calculations Tab, in the SWBT Call Waiting Per Line BNF LRIC Study).

(d) Sundry and Miscellaneous

The sundry and miscellaneous factor represents interest during construction and central office rearrangements required for the installation of equipment. This factor is developed by dividing Total Sundry and Miscellaneous Expense by Total Investment Material (as seen Tab 5 of the '95 Annual Cost Factors binder). This factor is then multiplied by Total EF&I Investment, resulting in sundry and miscellaneous costs (as seen in the third column of Line 7 on Schedule A of the Calculations Tab, in the SWBT Call Waiting Per Line BNF LRIC Study)

(e) Total Installed Cost

The values for Total EF&I Investment, Telco Engineering, Telco Plant Labor, and Sundry and Miscellaneous (Lines 4 through 7) are then summed resulting in Total Installed Cost (as seen in the third column of Line 8 on Schedule A of the Calculations Tab, in the SWBT Call Waiting Per Line BNF LRIC Study).

Staff Review and Recommendation

Staff believes that the general methods used to develop the sales tax, telco engineering, telco plant labor, and sundry and miscellaneous costs are logically consistent. Staff has verified the mathematical calculations. Staff, however, has only been provided with the source of the inputs used to develop these factors this week. Therefore, Staff has been unable to make an absolute determination as to whether or not the values of the factors are reasonable. Staff recommends that the factors be approved for the purpose of these LRIC studies, but reserves the right to reexamine the factors in later LRIC studies.

3. Determination of Total Investment

SWBT maintains that investment in switching equipment to provide a switching BNF causes a corresponding investment in power equipment and in central office buildings. The additional power investment and building investment are added to Total Installed Cost to arrive at Total Investment.

(a) Power Investment

The power investment factor, as described in Tab 5 of the '95 Annual Cost Factors binder, develops the cost of electrical equipment needed to operate the equipment in the central office. The factor is developed by the SWBT Separations organization from its Separations and Access Cost Allocation System. The factor is developed by dividing the power equipment booked costs in accounts 2210 (central office), 2220 (operator services), and 2230 (circuit equipment) by the total assets in those accounts. SWBT maintains that it would be difficult to differentiate power requirements between the three accounts and therefore it is appropriate to develop a power investment factor that aggregates the three accounts (see Tab 5 of the '95 Annual Cost Factors binder).

Staff Review and Recommendation

Staff has only been provided with the source of the inputs used to develop the factor this week. Therefore, Staff has been unable to make an absolute determination as to whether or not the value of the factor is reasonable. SWBT has assured Staff that, while the factor is developed by the SWBT Separations organization, the costs are not developed from a separations-type analysis. Staff recommends that the factor be approved for the purpose of these LRIC studies, but reserves the right to reexamine the factor in later LRIC studies.

(b) Total Equipment Investment

Total Equipment Investment (Line 10) is the sum of Total Installed Cost and Power Investment (Lines 8 and 9).

Staff Review and Recommendation

Staff has verified that the calculation is accurate. The number may change as a result of changed inputs per Staff recommendations.

(c) Total Investment With Fill

Total Investment with Fill (Line 11) is calculated by dividing Total Equipment Investment (Line 10) by the Fill factor. The fill factor represents the percent of usable capacity that is assumed to be used for costing purposes. The value of the fill factor is one because SWBT assumes full capacity utilization in accordance with § 23.91(f)(8).

Staff Review and Recommendation

Staff agrees that the value of the Fill factor is one. Staff has verified that the calculation is accurate. The number may change as a result of changed inputs per Staff recommendations.

(d) Building Investment

The building investment factor "recovers building investment for equipment." It is developed by dividing Annual Building Investment Additions by Annual Central Office Investment Additions (see Tab 5 of the '95 Annual Cost Factors binder). SWBT's method assumes that there is a direct causal relationship between the central office equipment and central office building requirements based on dollars of investment in central office equipment.

Staff Review and Recommendation

Staff believes that the portion of central office building investment required by a BNF, group of BNFs, service, or group of services should be recovered by the BNFs, services, or group of services that cause the central office building investment. Staff believes it may be possible to develop a building factor that relates building investment to the provision of a BNF, group of BNFs, service, or group of services. However, Staff does not believe that there is a direct relationship between investment dollars required for central office equipment and the investment dollars required for central office buildings. The use of an investment dollar as a method to identify responsibility for building investment can greatly distort the true responsibility a BNF, group of BNFs, service, or

group of services has for building investment For example, in a central office, the most expensive piece of equipment is likely to be the switch central processor; however, the switch central processor occupies a disproportionately small amount of floor space. The use of a building factor based solely on equipment investment would greatly exaggerate the building investment responsibility of the switch central processor. Therefore, Staff believes that a building factor based solely on central office equipment investment is not consistent with the principles, instructions, and requirements set forth in § 23.91. SWBT has agreed to remove the building investment factor from the studies at the present time, but is free in the future to propose an alternative method of assignment for these costs.

(e) Total Investment

Total Investment (Line 13) is the sum of Total Investment With Fill and Building Investment (Lines 11 and 12).

Staff Review and Recommendation

Staff has verified that the calculation is accurate. The number may change as a result of changed inputs per Staff recommendations

B. Determination of Annual Capital Costs and Annual Operating Expenses

This involves a two-part process. The first part converts the total capital investment required to provide the BNF into an annual capital cost to the firm. This conversion is done by the application of the depreciation, cost of money (return), and income tax factors. The second part determines the annual operating expenses of the firm that are incremental to (caused by) the investment in the BNF. This is done by applying annual expense factors to the total capital investment. When examining annual cost and expense factors, two questions should be asked (1) is the expense incremental to (caused by) the provision of the BNF; and (2) is the cost factor calculated correctly?

1 **1. Annual Capital Cost Factors.**

2 SWBT uses the Bellcore CapCost model to simultaneously develop its
3 depreciation, cost of money, and income tax factors. In general, the model assumes a
4 hypothetical original investment of $100,000 dollars in the first year. After initial
5 investment, the model uses a survivor curve to determine how much of the plant will be
6 retired in each year of service. The survivor curve shape is dependent on plant
7 characteristics that vary depending on the actuarial data and future expectations of a
8 particular group of assets used to provide telecommunications service. Then the model
9 calculates the capital costs incurred because of depreciation, the cost of money, and
10 income taxes. The model develops these costs in each year of the service life of the asset.
11 Then the present value of the stream of yearly capital costs is calculated. Finally, the
12 present value of each capital cost (depreciation, cost of money, income tax) is divided by
13 the present value of the average plant in service, resulting in a depreciation factor, a cost
14 of money factor, and an income tax factor

15 *(a) Depreciation*

16 The depreciation cost factor calculates the annual cost to the firm from consuming
17 a capital investment over a period of time. Subsection (f)(6) of § 23.91 states that "when
18 the company uses the most recent commission approved rate of depreciation for the
19 company there will be a presumption of reasonableness. The company shall justify the use
20 of any other rate."

21 The following discussion describes the two methods of calculating depreciation
22 that have been recognized by the Commission in the past, the Whole Life method and the
23 Average Remaining Life method:

24 **D.R. % (Whole Life Method) = (100-A.N.S.) / A.S.L.**

25 Where,

26 D.R. = Depreciation Rate

A.N.S. = Average Net Salvage expressed as a percent. This value represents the historically realized average net salvage value for a particular group of assets

A.S.L. = Average Service Life in Years. This parameter is based on a projected service life and an appropriate survivor curve shape. The survivor curve shape is dependent on plant characteristics that vary depending on the actuarial data and future expectations of a particular group of assets used to provide telecommunications service.

D.R.% (Remaining Life Method) = (100 - B.R - F.N.S) / A.R.L.

Where,

D.R. = Depreciation Rate

B.R. = Booked Depreciation Reserve Ratio expressed as a percent of original investment. This item is included in the equation in order to allow a company to recover all of its remaining invested capital in an asset over the remaining life of that asset.

F.N.S.= Future Net Salvage expressed as a percent. This value represents the future net salvage value to be realized at the end of the projected life of an asset. This parameter includes both historical experience and future expectation.

A.R.L. = Average Remaining Life in Years. This parameter is based on a projected service life and an appropriate survivor curve shape. The survivor curve shape is dependent on plant characteristics that vary depending on the actuarial data and future expectations of a particular group of assets used to provide telecommunications service.

The fundamental difference between these two methods is that the Average Remaining Life method incorporates the *existing* embedded plant through the booked

depreciation reserve ratio and allows it to be recovered over the *remaining* life of the asset (investment). The Whole Life method does not

SWBT maintains that the method CapCost uses to calculate depreciation is equivalent to the Average Remaining Life method with one key modification. SWBT assumes the booked depreciation reserve ratio to be zero. This assumption is made because in the theoretical "long run" there is no pre-existing accumulated depreciation. To develop the yearly depreciation (or booked depreciation expense), SWBT uses the following process. (For the sake of clarity, some simplifications have been made in the following description, for a complete description of the process please see the SWBT 1995 Capital Cost Factor Documentation binder)

- Using the appropriate survivor curve, SWBT obtains an End-of-Year Survivor Fraction for the particular year. This fraction is the percentage of the original investment expected to still be operating at the end of the year.
- The End-of-Year Survivor Fraction for the year is multiplied by the Original Investment to obtain the amount of End-of-Year Plant in Service for that year (or Remaining Plant)
- The Remaining Plant for the current year is subtracted from the Remaining Plant from the previous year to find the current End-of-Year Retirement (or the investment that is exhausted due to its obsolescence or consumption).
- The next step is to derive the Depreciation Fraction, or the net percentage of an investment that actually retires in the current year. This is done by subtracting from 100% the Gross Salvage percentage (or the percentage of the Retirement value SWBT gets from selling the retired investment for scrap) and adding the Cost of Removal percentage (or the percentage of the Retirement value SWBT will have to pay to get rid of the scrap). This calculation results in the Depreciation Fraction.

- In order to obtain the current year's Depreciation Expense, Equal Life Group accounting conventions are applied to the Depreciation Fraction and the End-of-Year Retirements
- The above process is repeated for each year of the service life of the asset, yielding Depreciation Expense for each year of the service life of the asset.
- The present value of the stream of Depreciation Expense amounts is calculated.
- The present value of the stream of Depreciation Expense amounts is divided by the present value of Remaining Plant in Service, resulting in the depreciation factor

Staff Review and Recommendation

Staff agrees that the use of a Remaining Life depreciation method with zero booked depreciation reserve ratio is consistent with the principles of long-run incremental costing. However, SWBT is not currently using parameters that have been agreed upon by SWBT, the FCC, and the Commission in their regular three-way meetings to set depreciation rates. Staff believes that SWBT should use the parameters approved in the 1995 three-way meeting. Some of the supporting documentation for this factor has only been provided this week. Therefore, Staff has been unable to make an absolute determination as to whether the values or the method used to develop the depreciation factor is reasonable. At this point, however, it appears that SWBT's depreciation factor will be consistent with the principles, instructions, and requirements set forth in § 23.91 if SWBT uses the parameters approved in the 1995 three-way meeting. Therefore, Staff believes the examiner should order SWBT to file amended BNF LRIC studies using depreciation rates based on the parameters approved in the 1995 three-way meeting. Staff reserves the right to reexamine the depreciation factor methodology in future LRIC studies. It is important to note that Staff's recommendation is limited to the purposes of cost identification pursuant to § 23.91 only and does not constitute approval of the depreciation method for the determination of revenue requirement in a rate case or in any

other proceeding. SWBT does not agree in principal with Staff's proposal to use depreciation rates based on the parameters approved in the 1995 three-way meeting in these studies, but because of time considerations it has agreed to accept Staff's recommendation for the limited purpose of the investment used in these particular studies, without waiving any rights to reexamine the issue in the future.

(b) Cost of Money

For a firm to be able to make an investment in capital it must first be able to acquire the necessary money. Typically, a firm has two primary methods to raise money. It can sell shares of ownership in the company (equity) or it can arrange for a loan (debt). Shareholders will not purchase equity (stock) in a company unless they expect a reasonable return on their equity investment. The rate of return on such investment required to induce shareholders to purchase equity (stock) is the "return on equity" or "cost of equity." Likewise, lenders will not loan money to a firm unless they expect to receive a reasonable return on the loan (debt). The rate of return on the loan necessary to induce lenders to offer the loan is the "return on debt" or the "cost of debt." The capital structure of a firm is made up of a proportion of debt and equity. To determine a firm's "cost of money" or "weighted average cost of capital" one multiplies the return on equity by the percentage of equity capital in the firm and multiplies the return on debt by the percentage of debt capital in the firm. For instance, a firm might finance a capital investment by raising 40% of the money through the sale of stocks (equity) requiring a 10% return on equity and raising 60% of the money through a loan (debt) requiring a 20% return on debt. The firm's cost of money or weighted average cost of capital would be:

$$(.4 \times .1) + (.6 \times .2) = .16$$

Overall, to satisfy stockholders and lenders the firm would need to earn a 16% return on capital investment to recover its cost of money and satisfy stockholders and lenders.

In the BNF LRIC studies, the return factor calculates the return on debt and equity that shareholders and lenders expect from the capital investment.

Subsection (f)(5) of § 23.91 reads as follows:

> *Cost of Money.* When a company uses the most recent commission approved rate of return for the company, as that term is used in § 23.21(c)(1) of this title (relating to Cost of Service) there will be a presumption of reasonableness. The company shall justify the use of any other rate.

The return factor calculated by SWBT does not use the 12.06% rate of return authorized in SWBT's last rate case, Docket No. 8585, for the company's cost of money. SWBT has proposed the use of a forward-looking cost of money (this information is proprietary, see '95 Cost of Money binder) for use in developing its depreciation, cost of money (return), and income tax factors. Staff believes the actual forward-looking cost of money for SWBT is between 9.5% and 10%. However, Staff believes that proposed cost of money is an acceptable compromise between SWBT's authorized rate of return and Staff's assessment of SWBT's actual cost of money. Therefore Staff recommends that proposed cost of money be accepted as the SWBT cost of money for the BNF LRIC studies.

SWBT develops its cost of money factor in the following manner:

- For each year of the service life, the model calculates the "Remaining Plant in Service" (from the depreciation component).
- The model subtracts "Depreciation Reserve" (from the depreciation component, Depreciation Reserve = Depreciation Expense - Retirement + Salvage - Removal) from "Remaining Plant in Service," resulting in "Net Investment."

- "Net Investment" minus "Tax Reserves" (analogous to Depreciation Reserves except using accelerated depreciation) equals "Capital Investment."
- "Capital Investment" multiplied by the cost of money equals "Post Tax Income"
- The above process is repeated for each year of the service life of the asset resulting in "Post Tax Income" for each year of the service life of the asset.
- The present value of the stream of "Post Tax Income" is calculated.
- The present value of the stream of "Post Tax Income" is divided by the present value of "Plant in Service" resulting in the "Cost of Money" factor.

Staff Review and Recommendation.

Staff has examined the formula SWBT uses to develop its cost of money factor. Staff believes the formula to be theoretically correct. Staff has verified the mathematic accuracy of the calculations for the digital switching account used in these studies (USOA 2212). As mentioned earlier, the CapCost model develops depreciation, cost of money, and income tax factors simultaneously Therefore, the application of depreciation parameters discussed above necessarily affects the value of the cost of money factor. Given that SWBT applies the parameters approved in the 1995 three-way meeting, Staff believes that SWBT's cost of money factor will be consistent with the principles, instructions, and requirements set forth in § 23.91

(c) Income Tax.

Another cost to the company resulting from the initial capital investment that can be calculated as annual expense is income taxes. It may help at this point to summarize the path of cost causation. First, in order to provide the BNF, a capital investment must be made; this capital investment is converted into an annual cost by use of the depreciation factor. Second, associated with the capital investment is the rate of return

shareholders expect from having made the investment. Finally, income taxes are paid on the return (income) received from the investment.

The income tax factor is used to determine the costs to the firm associated with paying federal income taxes on the return on equity portion of the cost of money. Taxes are not paid on the return on debt (interest) portion of the cost of money because interest (return) on debt is a tax-deductible expense that reduces income. (The income tax factor is shown on Line 16 of Schedule A of the Calculations Tab, in the of the SWBT Call Waiting Per Line BNF LRIC Study and is developed in both the Detail Report 12 of Tab 5 and the Summary Report of Tab 1 of the 1995 Capital Cost Factor Documentation binder.)

Staff Review and Recommendation.

SWBT's income tax factor involves a calculation that applies the federal income tax rate to the Post Tax Income - Debt Interest + Booked Depreciation - Booked Tax (accelerated) Depreciation. As with the other capital cost factors, the income tax amount is developed for each year of the service life of the asset. Then the present value of the stream of income tax amounts are calculated. Finally, the present value of the stream of income tax amounts is divided by the present value of Plant in Service, resulting in the income tax factor.

Staff has examined the formula SWBT uses to develop its income tax factor. Staff believes the formula to be theoretically correct. Staff has verified the mathematical accuracy of the calculations for the digital switching account used in these studies (USOA 2212). As already mentioned, the CapCost model develops depreciation, cost of money, and income tax factors simultaneously. Therefore, the application of depreciation parameters discussed above necessarily affects the value of the income tax factor. Given that SWBT applies the parameters approved in the 1995 three-way meeting, Staff believes that SWBT's income tax factor will be consistent with the principles, instructions, and requirements set forth in § 23.91.

(d) Total Annual Capital Costs

Total Annual Capital Costs (Line 17) is the sum of Depreciation, Cost of Money, and Income Tax (Lines 14, 15, and 16)

Staff Review and Recommendation

Staff has verified that the calculation is accurate. The number may change as a result of changed inputs per Staff recommendations

2. Annual Operating Expenses

(a) Equipment Maintenance

The equipment maintenance factor calculates the annual maintenance and repair expenses the firm incurs as a result of making the capital investment. This factor includes expenses for moving, changing, repairing, and maintaining plant equipment. SWBT develops this factor by dividing the actual booked maintenance and repair expenses associated with a specific investment account by the average plant balance (total investment) for that investment account (i.e. digital switching, USOA 2212) times a current cost /booked cost factor. This formula is:

$$\frac{\text{(maintenance expense)}}{\text{(CC/BC) x (maintenance investment)}}$$

The use of these factors presents a problem. Subsection (f)(2) of § 23.91 reads:

> ***Relating Expenses to BNFs.*** The company shall avoid the use of embedded cost data and shall determine expenses consistent with the principles of long run incremental costing.

The equipment maintenance factor proposed by SWBT relies on a historical relationship between maintenance expenses and investment. It assumes that if there were ten cents of maintenance expense for every dollar of investment in the past year, it is likely

that there will be ten cents of maintenance expense for every dollar of investment this year Keeping the instructions of subsection (f)(2) in mind, is SWBT's approach consistent with the principles of long-run incremental costing, or should an alternative method of relating maintenance expenses to investment be used? One alternative would be for SWBT to project the costs of maintenance for each specific least cost technology used by the company. But this would be a time consuming exercise and probably would still rely on a historical relationship. In fact, a projected factor that is not based on a historical relationship could be even less accurate than the historical factor SWBT proposes. One criticism of a historical factor is that since it is based on average plant balance for the specific account, it may exaggerate the maintenance costs of newer least cost technologies. But SWBT accounts for this, converting booked costs to current costs by multiplying the average plant balance (investment) with a current cost/booked cost factor. A current cost/booked cost factor allows booked investment dollars to be restated as if the investment were made in the current year. When the value of the current cost/booked cost factor is greater than one (i.e. the cost of replacing plant is greater than the booked value of plant), the value of the maintenance factor will be smaller (by increasing the size of the denominator). When the value of the current cost/booked cost factor is less than one the value of the maintenance factor will be higher. (The maintenance expense factor is shown in the second column of Line 18 on Page 1 of the Inputs Tab, in the SWBT Call Waiting Per Line BNF LRIC Study, and is developed in Tab 15, pages 15-1 and 15-2 in the '95 Annual Cost Factors binder. The current cost/booked cost factor is developed in Tab 13, Page 13-2 of the '95 Annual Cost Factors binder.)

Staff Review and Recommendation

Staff agrees with SWBT that maintenance/repair expenses are incremental to investment and that the use of a historical factor is practical. In general, SWBT's method for developing the maintenance/repair factor is logically consistent. Staff has verified the calculation reported in the '95 Annual Cost Factor binder.

(b) Buildings and Grounds Maintenance

SWBT proposes the use of a buildings and grounds maintenance factor. SWBT maintains that switching BNFs cause the purchase of switching equipment, switching equipment then causes building investment, and building investment causes annual buildings and grounds maintenance expense. While the value of the buildings and grounds maintenance factor is shown in the third column on Line 19 of Schedule A of the SWBT Call Waiting BNF LRIC study, there is no supporting documentation that describes its development.

Staff Review and Recommendation

As discussed above, Staff does not believe that SWBT has demonstrated the basis for an incremental relationship between switching BNFs and building investment. Since the buildings and grounds maintenance factor is applied in much the same manner as the building investment factor, Staff believes that the building and grounds maintenance factor is not consistent with the principles, instructions, and requirements set forth in § 23.91. SWBT has agreed to remove the building and grounds maintenance factor from the studies at the present time, but is free in the future to propose an alternative method of assignment for these costs.

(c) Administration Factor

SWBT proposes the use of an administration factor to recover expenses required to provide products or services that are not included in any other factors. This includes expenses for network administration and plant operations administration as well as annual capital costs of material and supplies, motor vehicles, furniture and office equipment, and other related administrative expenses. (The factor is developed in Tab 16 of the '95 Annual Cost Factors binder.)

Staff Review and Recommendation

Staff maintains that there is not a direct, definable incremental relationship between switching BNFs and administrative expenses such as those described above. This view is supported by SWBT's own documentation which states, '[a]dministrative expenses as those costs not directly related to, although required for, the provision of a specific product or service." Thus, Staff believes that the administration factor is not consistent with the principles, instructions, and requirements set forth in § 23.91 and should be removed. Although SWBT disagrees with Staff's position, it has indicated its willingness to accept Staff's recommendation.

(d) Miscellaneous Tax

The Miscellaneous Tax factor develops taxes other than the income tax that are caused by investment required to provide a BNF. The Miscellaneous Tax factor has three components: the ad valorem tax; franchise taxes; and other taxes. (The factor is developed in Tab 12 of the '95 Annual Cost Factors binder.)

Staff Review and Recommendation

The ad valorem tax represents property taxes levied on the firm by many jurisdictions. The franchise tax is levied on the assets of the firm. Since the capital investment required to provide a BNF is both property and an asset, it is appropriate to consider ad valorem taxes and franchise taxes as being incremental to switching BNFs. The majority of the "other taxes" component is comprised of the Texas PUC Access Line Fee. This component is obviously incremental to access lines rather than BNFs. Therefore, the "other taxes" component should be excluded from the Miscellaneous Tax factor for switching BNF LRIC studies. SWBT agrees to remove the "other taxes" component of the Miscellaneous tax factor.

(e) Commission Assessment

SWBT develops a factor to provide for the commission assessment as required by § 1.351 of PURA. This is applied to the sum of Total Annual Capital Costs, Equipment

Maintenance, Building and Grounds Maintenance, Administration, and Miscellaneous Tax (Lines 17 through 21) (The factor is developed in Tab 17 of the '95 Annual Cost Factors binder.)

Staff Review and Recommendation

Staff believes that the commission assessment can be thought of as incremental to the investment required to provide a BNF. The commission assessment factor developed by SWBT is appropriate. Staff has verified that the calculation shown on Line 22 is accurate. The number may change as a result of changed inputs per Staff recommendations.

C. Conversion of Annual Costs to the Appropriate Unit Costs

1. Total Annual Operating Expenses

Total Annual Operating Expenses (Line 23) is the sum of Total Annual Capital Costs, Equipment Maintenance, Building and Grounds Maintenance, Administration, Miscellaneous Tax, and the Commission Assessment (Lines 18 through 22).

Staff Review and Recommendation

Staff has verified that the calculation is accurate. The number may change as a result of changed inputs per Staff recommendations.

2. Total Annual Cost

The Total Annual Cost per unit of the BNF (Line 24) is the sum of Total Annual Capital Costs (Line 17) and Total Annual Operating Expenses (Line 23). For these initial studies the unit of the BNF is per line equipped with the feature. Other BNFs may have different units (e.g. per activation, per minute of use, etc.).

Staff Review and Recommendation

Staff has verified that the calculation is accurate. The number may change as a result of changed inputs per Staff recommendations

3. Total Monthly Cost

The Total Monthly Cost per unit of the BNF (Line 25) is calculated by dividing Total Annual Cost per unit of the BNF (Line 24) by twelve. For these initial studies the unit is per line equipped with the feature. Other BNFs may have different units (e.g. per activation, per minute of use, etc.)

Staff Review and Recommendation

Staff has verified that the calculation is accurate. The number may change as a result of changed inputs per Staff recommendations

D. Other Staff Recommendations

1. Application of a Levelized Inflation Factor.

To extend the usable life of the LRIC study and facilitate the application of BNF and service LRICs in the pricing activity mandated by § 23.91(p), SWBT proposes to apply a levelized inflation factor in the BNF LRIC studies. Staff concurs with the use of a levelized inflation factor but proposes that a non-proprietary inflation factor be adopted. SWBT has agreed to use the inflation factor developed by Staff and described below.

Discussion

The LRIC studies scheduled pursuant to § 23.91 will not determine long-run incremental costs for *all* BNFs and services until January 1997. It can be argued that, because of inflation, the LRIC studies currently being filed will under represent the long-run incremental costs of the firm at the time of the pricing activity. Staff believes there are

two alternative solutions to this problem updating the LRIC studies at the time of the pricing activity, or applying a levelized inflation factor

If the first alternative is selected, to update the LRIC studies at the time of the pricing activity, exactly how this would be done is uncertain. One extreme would have the company submitting updated cost studies for *all* BNFs and services. These studies would then have to go through the administrative review process. Conceivably, it could take at least another year to go through this process. A less extreme view contemplates only *some* of the LRIC studies being updated, and does not contemplate the updated studies having to go through the administrative review process. But this less extreme view is unclear. Who will decide which studies need to be updated, and on what basis, should parties be allowed to comment on the updated studies? Whether the more or less extreme view is taken, the logistics of updating and approving cost studies so costs are represented in current year dollars at the time of the pricing activity will be a logistically difficult task.

The alternative then is to build *expected* inflation into the studies. This alternative contemplates a three-year planning period for LRIC studies, in effect extending the life of studies filed in 1995 through 1997, studies filed in 1996 through 1998, etc. The use of the levelized inflation factor in no way limits the requirement for updated studies in § 23.91(l)(1). Staff is concerned with the views of some parties that the use of an inflation factor provides LECs with an opportunity to manipulate LRIC studies and overestimate costs. Therefore, Staff has developed its inflation factor with two guiding principles: (1) it must be free from the possibility of LEC manipulation; and (2) it must use a conservative expectation of inflation

Method

The general formula Staff used to develop the levelized inflation factor is the same formula SWBT uses to develop its company-specific inflation factor. However, keeping the two guiding principles in mind, Staff used different values for the inputs and applies the formula differently than SWBT proposes in its LRIC studies. The inputs are: plant

additions in each year of the planning period (expressed as a percent of total investment, discussion to follow), the company's cost of money (see Cost of Money, pg. 30 of this recommendation, or see the SWBT '95 Cost of Money binder), and the appropriate inflation index (discussion to follow)

Plant additions in each year of the planning period are developed by assuming that the total capital investment (as seen on Line 1 on the third column of Schedule A of the Calculations Tab, in the SWBT Call Waiting Per Line BNF LRIC Study), which can be thought of as investment *in plant*, is not made (added) in the initial year but over the three years of the planning period. For example, for a total investment of $600 dollars, the plant addition in each year of the planning period is $200 dollars (33 percent). This concept is independent of the *recovery* of the investment over the life of the investment determined by depreciation, return, and composite income tax factors. Plant additions are strictly used to develop the inflation index. In keeping with guiding principle number 1, Staff assumes equal investment over the planning period. Otherwise, by assuming that a greater percentage of total investment (plant addition) is made in the later years of the planning period, the value of the levelized inflation factor increases

In general, the levelized inflation factor formula takes the total capital investment for plant and divides it by the number of years in the planning period and applies the appropriate inflation index to each year's capital investment for plant. The first third of plant (assumed placed in 1995) would not have its capital investment (determined in 1995) inflated at all, the second third of plant (assumed placed in 1996) would have its capital investment (determined in 1995) inflated from 1995 to 1996, and the final third of plant (assumed placed in 1997) would have its capital investment (determined in 1995) inflated from 1995 to 1997. Summing these inflated investments results in the total inflated capital investment for plant additions over the life of the planning period. The next step is to calculate the net present value in the base year (first year of planning period) of the total inflated capital investment. This is done using the company's cost of money. The next step divides the net present value of the inflated capital investment over the planning